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SCREENING OF FUNGI FROM PADDY ARABLE LAND IN UTTAR PRADESH

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ABSTRACT

The study resulted in the five genera were recorded viz. Aspergillus sp., Penicillum sp., Mucor sp., Fusarium sp.and Rhizopus sp. consist in two region i.e. five block Ganga par region and five block Yamuna par region in district Allahabad. The results were obtained the seven Aspergillus sp. viz. A. fumigatus, A. niger, A. awamori, A. flavus, A. flavipes, A.versicolor, and A. nidulans, the six Penicillum sp. viz, P. variabile, P. notatum, P. citrinum, P. frequentans, P. sp., and P. steckii, the three Mucor sp. viz. M. racemosus, M. fragilis, M. mucedo, the three Fusarium sp. viz. F. sp., F. avenaceum, F. poae, the two Rhizopus sp. viz. R. stolonifer, R. oryzae also recorded consist in two region i.e. five block Ganga par region viz. Handiya, Saidabad, Soraon, Holagarh, Phupur and five block Yamuna par region viz. Manda, Uruwa, Meja, Koraon, Karchana. The maximum fungal species was recorded Aspergillus sp. followed by Penicillum sp., Mucor sp., Fusarium sp., Rhizopus sp. respectively. The most common isolates among them viz. A. fumigatus, A. niger, A. flavus, P. variabile, P. frequentans, P. sp., M. fragilis, M. mucedo, F. sp., F. avenaceum, R. oryzae were recorded in Ganga par region and Yamuna par region of Allahabad district in Uttar Pradesh.

KEYWORDS: Screening, Isolation, Soil Fungi, Paddy Field, Allahabad.

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INTRODUCTION

Rice is one of the most important and world's oldest crop species. It is the main food for more than a third of the world's population and provides 20% of the human calorie intake (R. Zeigler, A. Barclay. Rice, 2008). Paddy field soil contains rich organic matters like old stubble, paddy straw, senescent roots and wastes. Various fungi in soil contribute to decompose soil organic matter and paddy straw. Soil and water in paddy fields can affect the microflora community strongly (Kogawa et al., 1984).

The paddy field is a unique and important in agro-ecosystem because these fields left under drained conditions in off-crop season during rice cultivation. The paddy field ecosystem consists of diverse habitats for microorganisms. Because of these environment and condition various microbiological processes occurring in paddy fields, most of which are agronomically and biogeochemically important for rice production and soil of paddy fields (M. Kimura 2001; G.J.D. Kirk 2004). The environmental factors such as the soil pH, moisture, temperature, organic carbon and nitrogen play an important role in the distribution of mycoflora (Gaddeyya G, Shiny Niharika P 2012).

According to Hopkins (1909) Allahabad soils present a grater complexity than any district in plain of Uttar Pradesh. The hole of the trans-Ganga tract consists of the ordinary alluvium of the Gangetic plain.

Soil is a complex system. Many biological processes take place in soil and determine functions that provide various services within ecosystems: turn-over of organic matter, symbiotic and non-symbiotic atmospheric nitrogen fixation, gentrification, aggregation, etc. It regulates global biogeochemical cycles, filters and remediates anthropogenic pollutants, and enables food production (Kennedy and Smith, 1995; Richards, 1987). Several isolation methods of soil fungi have been attempted for study of soil microfungal flora (Tokumasu, 1974; Furuya and Naito, 1979; Min et al., 1981).

The chief goal of current study is to collect the soil sample and identify the fungi from Ganga par and Yamuna par region in Allahabad.

Study Area

The district of Allahaba is located between 24° 47’ N and 25° 47’ N latitudes and between 81° 19’E and 82° 21’E longitudes. It covers an area of 5246 km2. This district lies in the southern part of the state in the Gangetic plain and adjoining Vindhyan Plateau of India. Allahabad district is surrounded by district Bhadohi and Mirzapur in the East, Kaushambi and Banda in the west, Pratapgarh and Jaunpur in the North and Banda and Madhya Pradesh are in the south. River Ganga and Yamuna flow through the district.

MATERIAL METHODS

This research study was carried out between 15 Jun to 20 October 2014 in the Bhargva Agricultural Botany laboratories of the Department of Botany, University of Allahabad, Allahabad, Uttar Pradesh, India.

Collection of Soil Sample

The soil samples were from the Allahabad district of Uttar Pradesh consist in ten block, five block Ganga par region viz. Handiya, Saidabad, Soraon, Holagarh, Phupur and Yamuna par region five block viz. Manda, Uruwa, Meja, Koraon, Karchana have been collected for the test soil, the soil samples were taken during the first week of November 2014 in Paddy field**.** The samples were taken from the root region of rice by digging 10-15 cm depth under the soil. The collected samples were put into sterile polythene bags and stored at 4^{o}C until further analysis.

Isolation of Fungi from Collected Soil

The samples were processed in an isolation process using the soil dilution plate (Waksman, 1922). The soil fungus was isolated following the soil dilution plating technique of (Jonhson et al.1960). The soil dilution plate method (Manoch, 1998) was used to isolate fungi from the soil samples. Each soil sample was diluted to 1×10^{-4} concentration suspension. Then, 1 ml of the soil suspension (containing 0.0001 gm wet weight soil) was drawn by pipette into a Petri dish 90 mm in diameter. Soil samples use were collected, there were 45 Petri dishes used (0.0045 gm wet weight soil use). All the Petri dishes were incubated at room temperature (26-28°C) in darkness for 3-5 days or longer.

Identification of Fungi

The identification of fungi was done using the microscopic characters of the culture such as shape, size, color, pattern and arrangement of the mycelium, conidial arrangement, types of spores (Aneja,2001). All the isolated fungi were identified up to genus level or species level on the basis of detailed cultural and microscopic studied and by consulting relevant literature. The pure cultures of isolated fungal strains were maintained in PDA slants with streptomycin at 28°C during the study (K.R. Aneja 2004).

RESULTS

The study resulted in the five genera were recorded *viz. Aspergillus sp., Penicillum sp., Mucor sp., Fusarium sp.*and *Rhizopus sp*. consist in two region i.e. five block Ganga par region viz. Handiya, Saidabad, Soraon, Holagarh, Phupur and five block Yamuna par region viz. Manda, Uruwa, Meja, Koraon, Karchana in district Allahabad.

Table 1: Screening of Soil Fungi Isolate from Different Five Block Paddy Arable Land of Ganga Par Region in Allahabad District

S. No.	Fungal Genera	Soil Fungi sp.	Five Block Paddy Arable Land				
			Handiya	Saidabad	Soraon	Holagarh	Phulpur
1	*Aspergillus sp.*	*A. fumigatus*	+	+	+	+	+
		A. niger	+	+	+	+	+
		A. awamori	-	+	+	-	-
		A. flavus	+	+	+	+	+
		A. flavipes	+	+	-	+	+
		A. versicolor	-	-	-	-	+
		A. nidulans	+	+	-	+	-
2	*Penicillum sp.*	*P. variabile*	+	+	+	+	+
		P. notatum	+	-	-	+	+
		P. citrinum	-	+	-	+	-
		P. frequentans	+	+	+	+	+
		P. sp.	+	+	+	+	+
		P. steckii	-	-	-	-	+
3	*Mucor sp.*	*M. racemosus*	-	-	+	+	+
		M. fragilis	+	+	+	+	+
		M. mucedo	+	+	+	+	+
4	*Fusarium sp.*	*F. sp.*	+	+	+	+	+
5	*Rhizopus sp.*	*F. avenaceum*	+	+	+	+	+
		F. poae	+	-	+	-	-
		R. stolonifer	+	-	-	+	+
		R. oryzae	+	+	+	+	+

The results were obtained the seven *Aspergillus sp. viz. A. fumigatus, A. niger, A. awamori , A. flavus, A. flavipes, A.versicolor,* and *A. nidulans*, the six *Penicillum sp. viz, P. variabile, P. notatum, P. citrinum, P. frequentans, P. sp.,* and *P. steckii*, the three *Mucor sp. viz. M. racemosus, M. fragilis, M. mucedo*, the three *Fusarium sp. viz. F. sp., F. avenaceum, F. poae,* the two *Rhizopus sp. viz. R. stolonifer, R. oryzae* also recorded consist in two region i.e. five block Ganga par region viz. Handiya, Saidabad, Soraon, Holagarh, Phupur (Table 1) and five block Yamuna par region viz. Manda, Uruwa, Meja, Koraon, Karchana (Table 2) in district Allahabad.

Table 2: Screening of Soil Fungi Isolate from Different Five Block Paddy Arable Land of Yamuna Par Region in Allahabad District

S. No.	Fungal Genera	Soil Fungi sp.	Five Block Paddy Arable Land				
			Manda	Uruwa	Meja	Koraon	Karchana
1	***Aspergillus sp.***	*A. fumigatus*	+	+	+	+	+
		A. niger	+	+	+	+	+
		A. awamori	-	-	+	-	-
		A. flavus	+	+	+	+	+
		A. flavipes	+	-	-	+	+

		A. versicolor	-	+	-	-	+
		A. nidulans	+	-	-	+	-
2	***Penicillum sp.***	*P. variabile*	+	+	+	+	+
		P. notatum	+	-	-	+	-
		P. citrinum	-	-	-	+	+
		P. frequentans	+	+	+	+	+
		P. sp.	+	+	+	+	+
		P. steckii	-	+	-	-	+
3	***Mucor sp.***	*M. racemosus*	+	-	+	+	-
		M. fragilis	+	+	+	+	+
		M. mucedo	+	+	+	+	+
4	***Fusarium sp.***	*F. sp.*	+	+	+	+	+
		F. avenaceum	+	+	+	+	+
		F. poae	+	-	-	+	+
5	***Rhizopus sp.***	*R. stolonifer*	+	+	-	-	+
		R. oryzae	+	+	+	+	+

The maximum fungal species was recorded *Aspergillus sp.* followed by *Penicillum sp., Mucor sp., Fusarium sp., Rhizopus sp.* respectively. The most common isolates among them viz. *A. fumigatus, A. niger, A. flavus, P. variabile, P. frequentans, P. sp., M. fragilis, M. mucedo, F. sp., F. avenaceum, R. oryzae* were recorded in Ganga par region and Yamuna par region of Allahabad district.

DISCUSSIONS

The result investigation among the obtained fungal isolates the genera *Aspergillus* and *Penicillium* were maximum recorded in Ganga par and Yamuna par region of Allahabad district. The most common isolates among them viz. *A. fumigatus, A. niger, A. flavus, P. variabile, P. sp., M. fragilis, M. mucedo, F. sp., F. avenaceum, R. oryzae* were recorded. In the experiment, the screening of fungi from paddy arable land in fungal *sp. A. awamori* is absent in Holagarh, Phulpur and this *sp.* is present in Saidabad, Soraon in Ganga par region. In Ymuna par region this sp. is present in Meja block and absent in Mnada, Uruwa, Koraon, Karchana. *A. flavipes* is present in Handiya, Saidabad, Holagarh, Phulpur and absent in Soraon in Ganga par region. In Ymuna par region this *sp.* is present in Manda, Koraon, Karchana and this *sp.* is absent in Uruwa, Meja. *A. versicolor* is present in Phulpur and this *sp.* is absent in Handiya, Saidabad, Soraon, Holagarh in Ganga par region. This *sp.* is present in Uruwa, Karchana and absent in Manda, Meja, Koraon block in Ymuna par region. *A. nidulans* is present in Handiya, Saidabad, Holagarh and absent in Soraon, Phulpur in Ganga par region . In Ymuna par region this *sp.* is present in Manda, Koraon and absent in Uruwa, Meja, Karchana. The fungal sp. *P. notatum* is present in Handiya, Holagarh, Phulpur and absent in Saidabad, Soraon in Ganga par region. In Ymuna par region this *sp.* is present in Manda, Koraon and absent in Uruwa, Meja, Karchana. *P. citrinum* is present in Saidabad, Holagarh and absent in Handiya,

Soraon, Phulpur in Ganga par region. In Ymuna par region this *sp.* is present in Koraon, Karchana and absent in Manda, Uruwa, Meja. *P. steckii* is present in Phulpur and absent in Handiya, Saidabad, Soraon, Holagarh in Ganga par region. In Ymuna par region this *sp.* is present in Uruwa, Karchana and absent in Manda, Meja, Koraon. *M. racemosus* is present in Soraon, Holagarh, Phulpur and absent in Handiya, Saidabad in Ganga par region. In Ymuna par region this *sp.* is present in Manda, Meja, Koraon and absent in Uruwa, Karchana. *F. poae* is present in Handiya, Soraon and absent in Saidabad, Holagarh, Phulpur in Ganga par region. In Ymuna par region this *sp.* is present in Manda, Koraon, Karchana and absent in Uruwa, Meja. *R. stolonifer* is present in Handiya, Holagarh, Phulpur and absent in Saidabad, Soraon in Ganga par region. In Ymuna par region this *sp.* is present in Manda, Uruwa, Karchana and absent in Meja, Koraon.

CONCLUSIONS

The result were present paddy arable land in Allahabad district. The maximum fungal species was recorded *Aspergillus sp.* followed by *Penicillum sp., Mucor sp., Fusarium sp., Rhizopus sp.* The most common isolates among them viz. *A. fumigatus, A. niger, A. flavus, P. variabile, P. sp., M. fragilis, M. mucedo, F. sp., F. avenaceum, R. oryzae* were recorded in Ganga par region and Yamuna par region of Allahabad district.

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